National Aeronautics and
Space Administration

The Day Joshua Jumped Too Much

Written By:
Alison Houpt &
Aleya Littleton

Illustrated By:
Jennifer Hammond

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PREFACE

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Hiding science in a storybook...

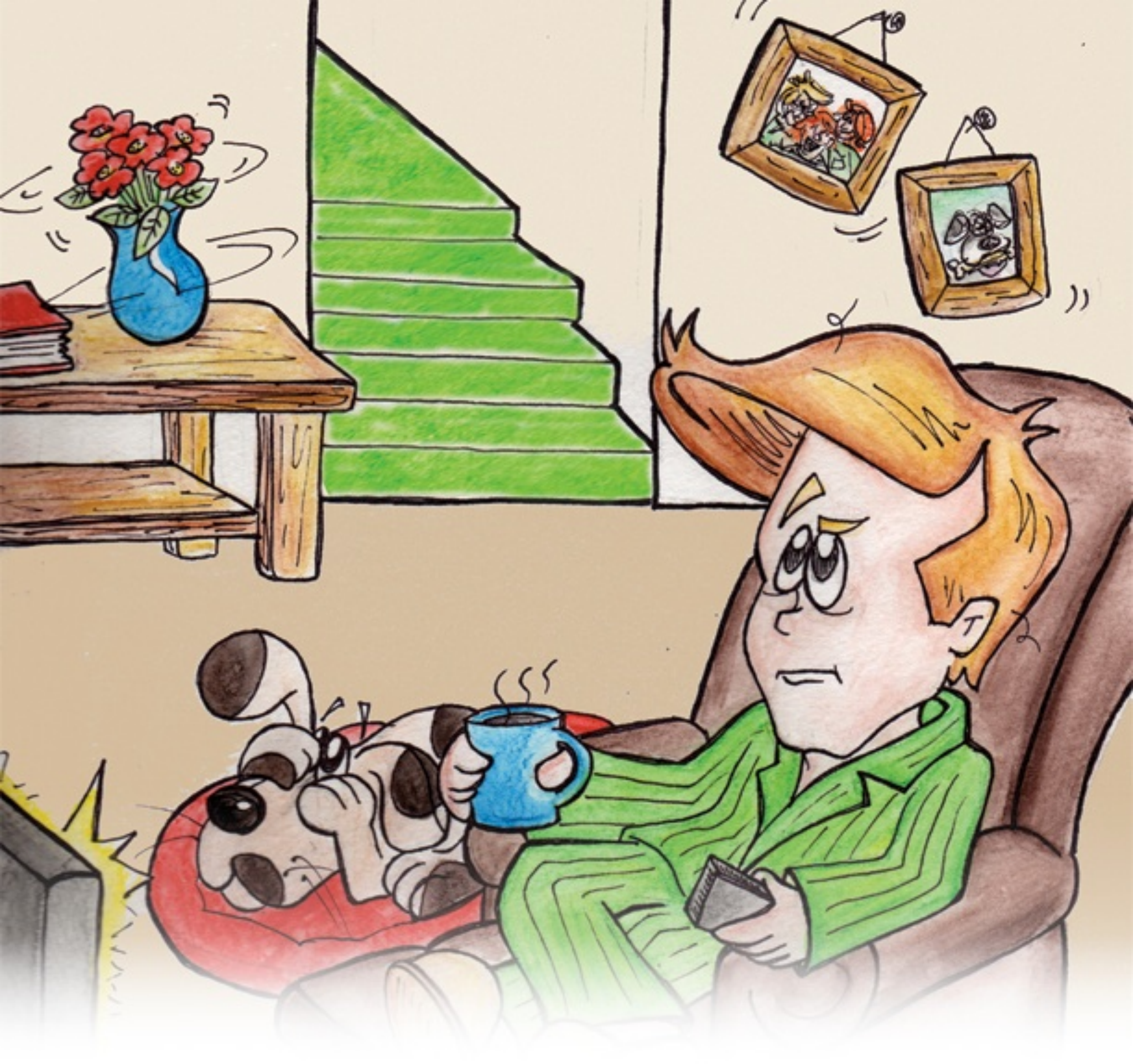
Think Scientifically books, from NASA's Solar Dynamics Observatory team, integrate a classic storybook format with rich science content, hands-on activities, and interdisciplinary connections

Follow along with Joshua in "The Day Joshua Jumped Too Much" as he learns about Earth's energy source and what the world would be like without it!

To download the free teacher resources that accompany this book, please visit:
http://sdo.gsfc.nasa.gov/epo/educators/thinkscientifically.php

It was just a regular day in the Smith house. Mr. Smith awoke early due to the bright light shining in his room from the hallway, and all the crashing and banging.

Mr. and Mrs. Smith passed Joshua's room nervously as they went downstairs to start their day.



As usual, Mr. Smith tried to relax in front of the television. It was very difficult for him to relax though; the house would shake and rumble too much for the television to be heard. The source of it all: Joshua.

Joshua is a very hyperactive boy. He jumps and dives around his room from early morning till night playing imaginary space invader games. On this particular day, Mr. Smith could not take one more pound or rattle. He went upstairs to do some pounding of his own on Joshua's door.

As Joshua opened the door, Mr. Smith squinted and put his hand over his eyes. "Joshua," Mr. Smith began, "your bouncing and booming must stop! Also, all the lights and gadgets plugged in here are using enough energy to light an entire city!"

At that, Mr. Smith froze in his thoughts. What was he going to tell Joshua that he hadn't already told him to make him stop bounding, leaping, and being wasteful? He quickly conjured up a plan and said, "If you continue this behavior, young man, you are going to use up all the energy on Earth!"

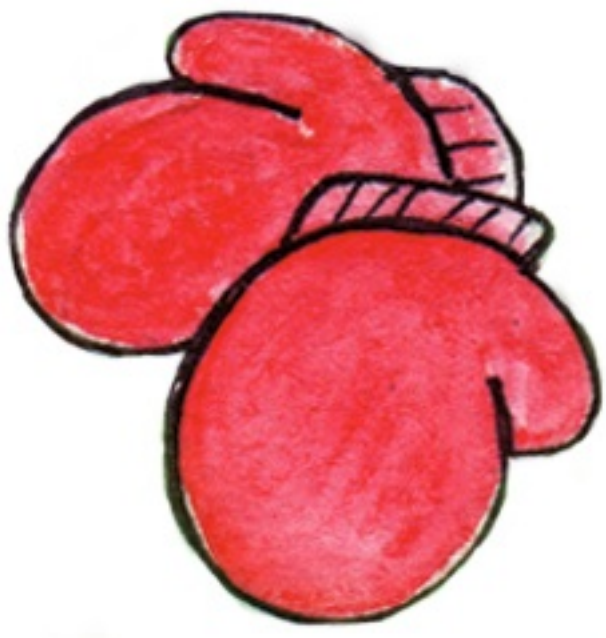
Joshua halted in his tracks. “What do you mean I will use up all the energy on Earth?” he asked with concern.

“With as much energy as it takes to run all the lights and gadgets in your room, and as much energy as it takes for you to play, I just don’t see how there can be enough energy to keep you going!” Mr. Smith answered.

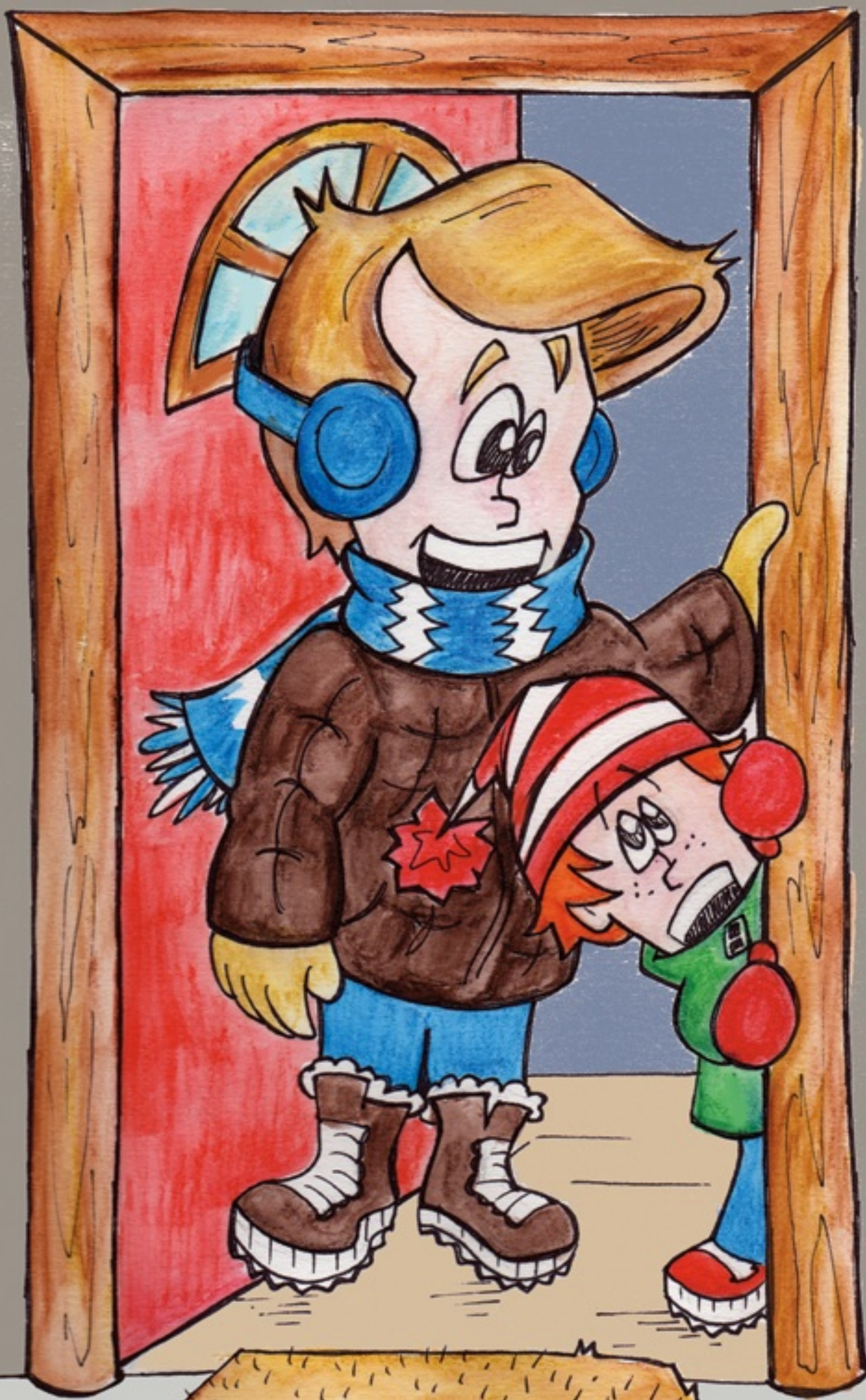
“What would the world be like if I used up all the energy on Earth?” inquired Joshua.

“Bundle up like you are about to go skiing all day in a huge blizzard and meet me at the front door,” instructed Mr. Smith.

Joshua was rather confused. Why would he bundle up, it was a warm summer day? He did as he was told and met his father at the front door. Mr. Smith was all bundled up too.




WINTER
CLOTHES



Mr. Smith opened the front door. Joshua must have walked out the same front door a million times, but what he saw now was not familiar.

A chill ran through Joshua from the bitter cold. It was as though the world had been transformed into a dismal, colorless nightmare. Mr. Smith broke the silence.

“This is what the world would look like if all the energy on Earth was used. What do you notice is missing?” he asked.

The ground was frozen beneath him and the dirt crunched beneath his boots. Everything around him was dark. There were no lights shining through the windows of houses or buildings. The street lamps were out. The only light was the soft twinkle of stars in the sky.

“Well for starters, it is supposed to be late afternoon, but the Sun is missing and it is freezing out here!” said Joshua as his body began to shiver from the cold.

“Good observations!” Mr. Smith replied. “The Sun is the primary source of heat and light energy on the Earth. The Sun gives off energy that reaches us in waves. We cannot see the waves. This is called radiation. The radiation from the Sun heats everything on Earth from land to sea. Without the Sun there is no heat or light.”

“Why is there no light inside the houses or buildings?” Joshua asked.

“Without the Sun, we would not have resources like coal and oil that we use to produce electricity. That means no television, no heat, no computer, no video games, and no lamps. People are dependent on the Sun for energy.”

“What about wind farms?” Joshua asked. “I learned about them in science class. Big wind mills convert wind to energy.”

“Joshua, that’s a good thought, but even wind is caused by energy from the Sun. The Sun heats the Earth unevenly. Wind is caused by air being warmed, and by warm air and cool air mixing,” explained Joshua’s dad.

The two began to walk around the house. The flower garden, which once bloomed with vibrant, colorful tulips and lilies, was now just a frozen patch of dirt. There were no flowers in sight.

“What about power plants?” Joshua suggested. “Some power plants burn things to get energy without the Sun.”

“Look around you,” Mr. Smith said. “What could you burn?”

Joshua inspected his dark, barren surroundings. He could not see one thing to burn. There were no trees around which meant there was no wood to burn. He ignored his father’s question and interrupted with one of his own. “Why don’t I see flowers or trees?”

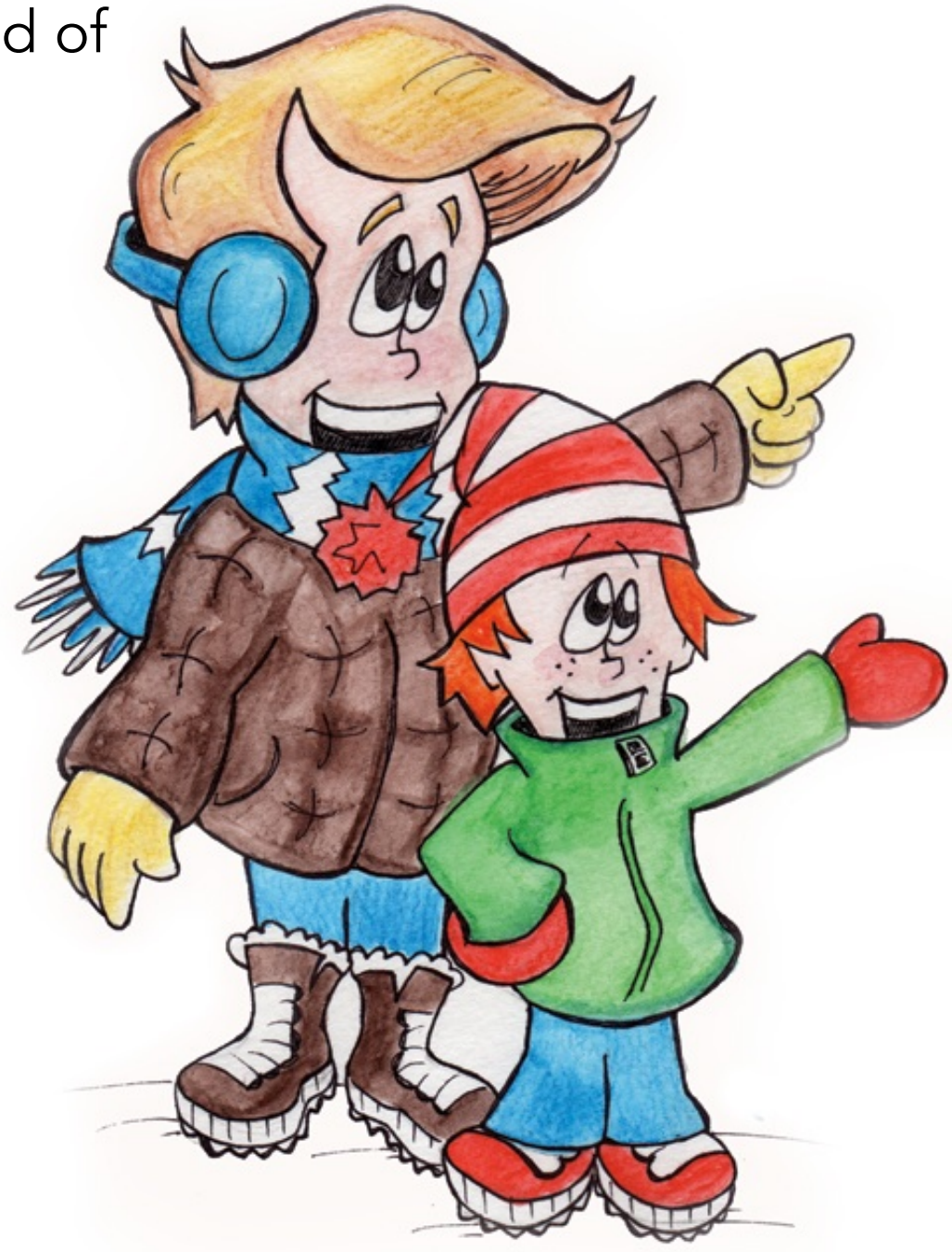
“All plants use the Sun’s energy to make food. Without the Sun, flowers, trees and grass cannot make the food they need to live.”

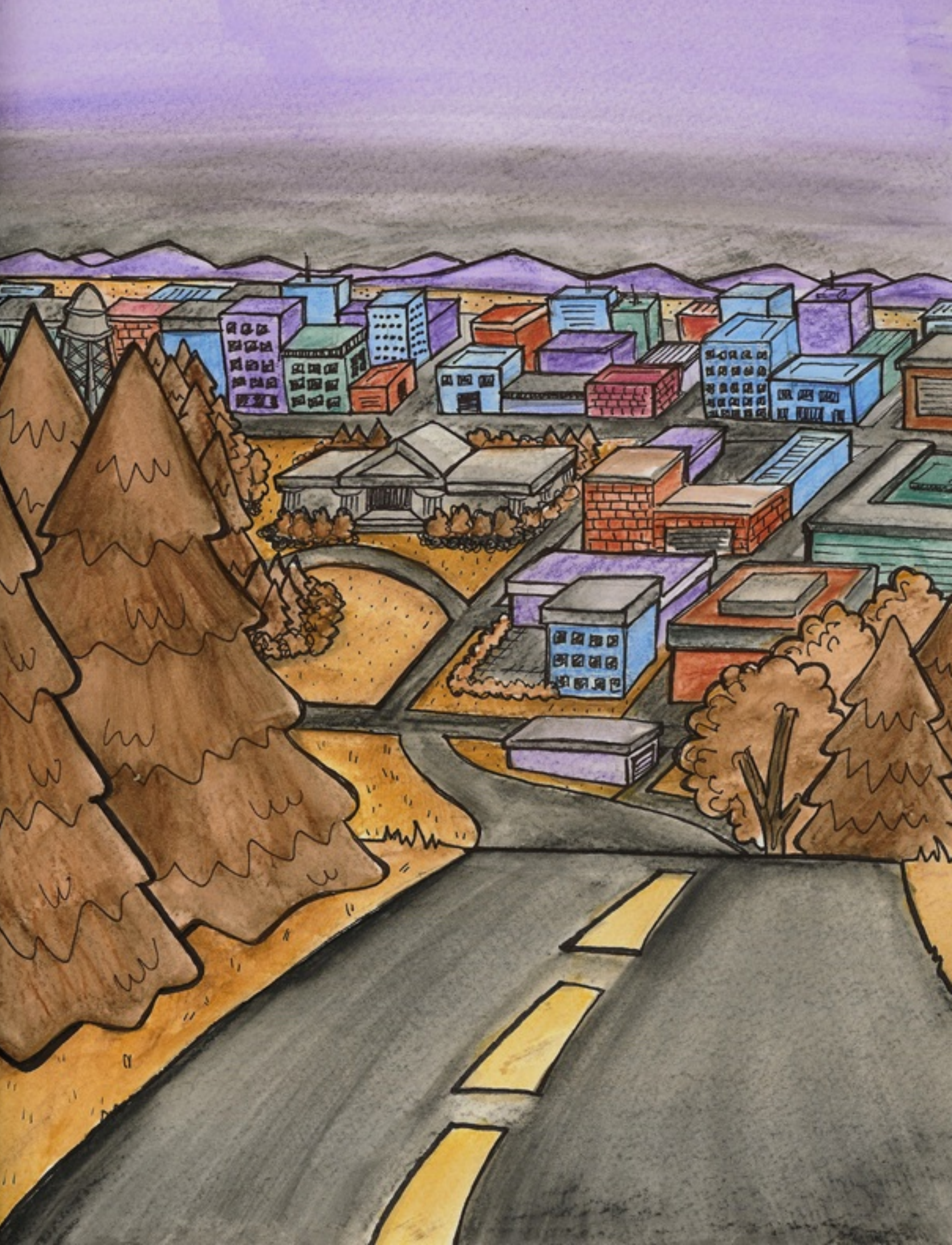
“It is so quiet out here,” Joshua added. “I do not hear the usual chirping of birds, the buzzing of insects, or see any animals scurrying around. Why is there no wildlife?” Joshua wondered out loud.

“Without heat, birds and insects cannot live. It is also much too cold out here for many animals to survive. Even if an animal could survive this cold, they would have nothing to eat,” began Mr. Smith.

Humans get their food from the Sun’s energy as well. The Sun’s energy is what makes fruits and vegetables grow. Fruits and vegetables are plants we eat.

Small animals eat the plants. Then bigger animals eat the smaller animals, and so on. It’s like a pyramid of energy with the Sun on the bottom and us at the top,” continued Joshua’s dad.





Joshua tried to imagine life without the colors of flowers and the sights of animals. Thinking about it was making him sad. Just then he noticed how quiet it was outside. “How come there aren’t cars on the road?”

“The oil used to run cars comes from plants. Again, plants cannot grow without the Sun. Our cars are useless now.” He was beginning to get too cold to stay outside much longer. “Ready? Let’s go back to the house,” Mr. Smith suggested.

Joshua was happy to turn around and walk back to the house. He was shivering all over and he was starting to lose feeling in his fingers. As the two began walking, Mr. Smith added, “Without the energy from the Sun, all our water would be frozen as well.”

Joshua was already having trouble understanding what was around him. No water? That means no swimming, no water slides, no drinks of water! No wonder nothing could survive!

He almost did not believe his dad until they walked over what used to be a stream running through their backyard. Now it was just a slippery, solid line of ice.

When Joshua and his dad reached the front door, neither of them went in. Joshua had a very sad expression.
“What’s wrong?” his dad asked.

“Is it really possible for me to do this to the world by using so much energy and playing all the time?” asked Joshua.

“No son, it is not possible for you to use up all the energy on Earth. The Sun will shine for billions of years. I said that so you would stop smashing and bashing in your room. You could certainly do your part by trying to save energy. We use the Earth’s resources to make electricity and that should not be wasted,” Mr. Smith answered.

“Now I know where Earth’s energy comes from!” declared Joshua. “And I will save all the energy I can from now on,” he added with a chattering smile. At this point his toes were beginning to feel numb.

Mr. Smith opened the front door and in an instant everything went back to normal. Mrs. Smith walked by the front door on her way upstairs and got a glimpse of the two. “What on Earth are you two doing wearing all those clothes? It’s summer!”

Joshua and his dad smiled at each other. “Oh nothing!” they both replied as they said goodnight to Mrs. Smith and went to bed.

The next day was not an ordinary day in the Smith house. Mrs. Smith slept in for the first time in years! There were no bright lights streaming in her bedroom knocking on her eyelids. In fact, there was no knocking or crashing at all!

Mr. Smith even woke up a little later than normal himself. As usual, he went downstairs to relax in front of the television. When he turned the set on, the strangest thing happened...

He could hear it!

CHAPTER 2

ABOUT THE AUTHORS

Aleya Littleton

Aleya Littleton is the Formal Education Coordinator for the Solar Dynamics Observatory. She works NASA's Goddard Space Flight Center in Maryland making things for students and teachers, visiting classrooms, blowing things up, and getting messy – for science! She is a former middle school teacher, having taught in Pennsylvania and Florida. When she has spare time, you can find her climbing rocks, planning adventures, and plotting world domination.

Ali Houpt

Ali Houpt proclaimed as a little girl that she would one day grow up to be a teacher and a writer. She currently teaches sixth grade at South Mountain Middle School in Allentown, Pennsylvania, where she also resides. Ali lives with her husband, Tim, several pet turtles, and a cat named Sweetie Pie (who she taught to give kisses). When Ali is not teaching or writing, you can find her doing a variety of crafts or fishing with her husband.

"I dedicate this book to my father, Robert H. Hegney (1953 - 2007), who once told me the Earth was running out of gravity so I would stop jumping and tumbling and shaking the house."

CHAPTER 3

ABOUT THE ILLUSTRATOR

Jennifer Hammond

Jennifer Hammond is an Alexandria, Virginia native with a passion for all things creative. After graduating in the Fall of 2008 with a Master's Degree in History from George Washington University, Jennifer decided to delay her history career so that she could pursue her other passion – art. By day Jennifer can be found in Old Town walking dogs; by night she's hard at work on the latest art project. Jennifer has been creating a wide array of art projects on commission since 2000. Her most recent projects have included everything from illustrations and cartoons to murals and paintings and even party planning. Jennifer is very excited about the opportunity to work with NASA's Goddard Space center on their "Thinking Scientifically" series – a chance for her to combine her love of illustration with her experience in education.

"To my brother J. and to my friend CD, thank you for showing me the true meaning of perseverance and courage - you are real-life heroes."

CHAPTER 4

ABOUT THE MISSION

The Solar Dynamics Observatory

SDO is the most advanced spacecraft ever designed to study the Sun and its dynamic behavior. It is providing better quality, more comprehensive data faster than any NASA spacecraft currently studying the Sun and it's processes. SDO will unlock the secrets of how our nearest star sustains life on Earth, and affects the planets of our solar system and beyond.

- To learn more about SDO visit http://sdo.gsfc.nasa.gov.
- To download the free teacher resources that accompany this book, please visit: http://sdo.gsfc.nasa.gov/epo/educators/thinkscientifically.php

CHAPTER 5

GLOSSARY

Electricity - A form of energy that is either found in nature or artificially produced by batteries, power plants, etc. Electricity is used to power homes and businesses, automobiles, streetlights, and many other items that we regularly use!

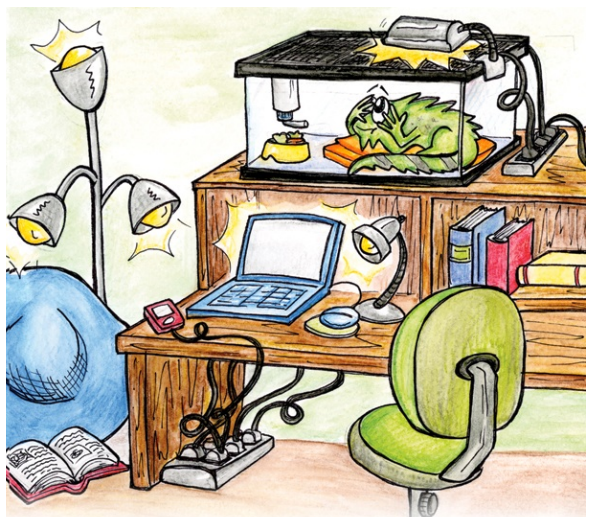
Energy - The ability to do work. Energy comes in many forms like light, heat and electricity.

Radiation - Energy that travels as a wave. Examples include visible light (the light we can see) and X-rays.

Waves - The "up and down" form in which energy travels. Waves in the ocean are caused by energy moving through the water. Sound waves are energy moving through the air. Light waves are energy moving through space, air, or other substances.

Wind Farm - A group of wind mills in the same location used to produce electricity. (See page 15 for a picture of a wind farm.)

Wind Mill - A structure with parts that are turned around by the wind, which is used to produce electricity.



*Many items in Joshua's room need **electricity** to work!*

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Related Glossary Terms

Energy, Wind Farm, Wind Mill

Index Find Term

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Drag related terms here

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